488-186

FOCUS FADER WITH ADJUSTABLE TENSION

BACKGROUND OF THE INVENTION

This application is a continuation-in-part application of application serial number 09/634,410 entitled "Focus Fader with Dual Optocouplers" filed on August 9, 2000, the contents of which are hereby incorporated by reference.

Field of the Invention

This invention pertains to a cross fader with dual optocouplers and a handle with adjustable tension, which can be used in a DJ (disk jockey) mixer or as a replacement cross fader for a DJ mixer.

Description of the Prior Art

In the prior art, cross faders have used resistive components to allow a user, such as a disk jockey, to cut or short out a first signal from a respective channel of audio signal, while allowing the opposite channel of signal to pass. However, such resistive cross faders have been deficient with respect to noise, wear characteristics and lack of complete cutting of the respective signal.

The parent application of the instant application relates to the use of dual optocouplers to address this deficiency of the prior art. This has been found very satisfactory. However,

it is desired to improve this apparatus by providing adjustable tension in the handle.

OBJECTS AND SUMMARY OF INVENTION

It is therefore an object of the present invention to achieve all of the objects of the parent application with respect to a cross fader, and to further provide a cross fader in which the tension of the handle can be adjusted.

These and other objects are attained by providing a cross fader which uses dual optocouplers -- one for each respective channel of the audio signal and located at each end of the fader travel. A blade shutter is positioned by guide rods so that it passes between the operational slots of the optocouplers. The blade shutter is mechanically coupled to a knob on the outside of the cross fader so that the operator can move the blade shutter into the operational slot of an optocoupler, thereby cutting the channel of the audio signal from that optocoupler while allowing the other channel of the audio signal from the other optocoupler to pass unimpeded.

The optocouplers are mounted on a p.c. board for ease of assembly. Likewise, the entire mechanism is mounted to a mounting plate for ease in replacement and securing to the frame of the disk jockey mixer.

Furthermore, the slider of the present invention, which is positioned by guide rods, includes tension plates which impinge against at least one of the guide rods. The tension plates are secured to the slider assembly by screws, so that the tension of the screws can be adjusted thereby varying the tension of the tension plates against the guide rod(s) thereby varying the tension of the slider assembly. This variation of the tension provides for variation in ease of manually moving the slider.

DESCRIPTION OF THE DRAWINGS

Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein:

Figure 1 is a side plan view, partially in phantom, of the slide assembly of the cross fader of the present invention.

Figure 2 is a top plan view, partially in phantom, of the slide assembly of the cross fader of the present invention.

Figure 3 is an end plan view, partially in phantom, of the slide assembly of the cross fader of the present invention.

Figure 4 is a side plan view partially in phantom, of the slide of the slide assembly of the cross fader of the present invention.

Figure 5 is a bottom plan view of the slide of the slide assembly of the cross fader of the present invention.

Figure 6 is a top plan view, partially in phantom, of the slide of the slide assembly of the cross fader of the present invention.

Figure 7 is a cross-sectional view along plane 7-7 of Figure 6.

Figure 8 is a top plan view of the tension plate of the slide assembly of the cross fader of the present invention.

Figure 9 is a side plan view of the tension plate of the slide assembly of the cross fader of the present invention.

Figure 10 is a side plan view of a typically screw used to fasten the tension plate to the slide of the slide assembly of the cross fader of the present invention.

Figure 11 is a bottom plan view of the shutter of the cross fader of the present invention.

Figure 12 is a side plan view of the shutter of the cross fader of the present invention.

Figure 13 is a top plan view of the shutter of the cross fader of the present invention.

Figure 14 is a top plan view of the fader slide body of the cross fader of the present invention.

Figure 15 is a side plan view of the fader slide body of the cross fader of the present invention.

Figure 16 is an end plan view of the fader slide body of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

At the outset, the parent application, application serial number 09/634,410 entitled "Focus Fader with Dual Optocouplers" filed on August 9, 2000, is hereby incorporated by reference.

Referring now to the drawings in detail wherein like numerals refer to like elements throughout the several views, one sees that Figure 1 is a side view of slide assembly 10 of the present invention for a cross fader. Slide assembly 10 includes slider 12 (see Figures 4-7) and shutter 14 (see Figures 11-13). Slider 12 is typically made of plastic. Shutter 14 is typically made of metal. Additionally, as shown in Figure 3, slide assembly 10 includes tension plates 16 (see also Figures 8 and 9) which are secured to slider 12 by self-tapping screws 20 (see also Figure 10). Tension plates 16 are typically formed of plastic.

Slider 12 includes main body 22 with upwardly pointing fin-like handle 24 integrally formed therein. Main body 22 includes two longitudinally oriented partially open passageways 26, 28. Guide rods 102, 104, in a fixed position with respect to cross fader slide body 100 as shown in Figure 16, pass through passageways 26, 28 and provide a path of travel for slide assembly 12 wherein fin-like handle 24 protrudes through slot 106 (see Figure 14) of cross fader slide body 100.

As shown in Figure 2, partially open passageway 26 is bounded by walls 30, 32 with round apertures 34, 36, respectively, passing therethrough. Open channel 38 is formed between walls 30, 32. Guide rod 102 passes through apertures 34, 36 which slidingly positions slider assembly 10. Guide rods 102 further passes through open channel 38.

Partially open passageway 28 includes central wall 40 with round aperture 42 therethrough and open channel segments 44, 46 on the sides of central wall 40. Guide rod 104 passes through aperture 42 which further slidingly positions slider assembly 10. Recesses 50, 52 are formed laterally adjacent to open channel segments 44, 46, with threaded apertures 54, 56 formed therein. This allows tension plates 16 to be placed in recesses 50, 52 so that tension plate apertures 17 align with threaded apertures 54, 56. Self-tapping screws 20 pass through tension plate apertures 17 and threaded apertures 54, 56. This causes tension plates 16 to be radially urged against guide rod 42. Progressively tightening self-tapping screws 20 causes tension plates 16 to be urged progressively tighter against guide rod 104 thereby increasing the friction between tension plates 16 and guide rod 104 and increasing the tension which the user encounters when moving slider assembly 10 by handle 24.

The underside of main body 22 includes three positioning bosses 60, 62, 64.

Shutter 14 includes three metal portions at successive right angles - upper attachment portion 70, middle shutter portion 72 which interacts with the optocouplers (as described in the parent application) and lower portion 74. Portions 70 and 74 are parallel to each other, and are perpendicular with middle shutter portion 72. Upper attachment portion 70 includes three positioning apertures 76, 78, 80 through which positioning bosses 60, 62, 64 of the underside of main body 22 of slider 12 pass. A heat seal is then applied to the exposed portion of positioning bosses 60, 62, 64 to fasten shutter 14 to slider 12. Shutter 14 then, of course, moves in concert with slider 12. Additionally, if the shank 21 of self-tapping screw 20 is longer than the depth of slider 12, then apertures 82, 84 are formed in upper attachment portion 70 of shutter 14 to align with threaded apertures 54, 56 to allow any portion of shank 21 protruding from the underside of slider 12 to pass therethrough.

Thus the several aforementioned objects and advantages are most effectively attained. Although preferred embodiments of the invention have been disclosed and described in detail herein, it should be understood that this invention is in no sense limited thereby and its scope is to be determined by that of the appended claims.